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Callithamnion Turneri Ag.
Callithamnion Daviesii Ag.
Callithamnion luxurians Ag.

CHLOROSPERMEÆ (Grass-green Algæ).

Bryopsis plumosa Lam.
Vaucheria (species not described by Harvey, allied to V. Murina).
Porphyra vulgaris Ag.
Bangia fuscopurpurea Lyngb.
Enteromorpha intestinalis Linb.
Enteromorpha Hopkirkii M'Calla.
Enteromorpha compressa Grev.
Enteromorpha clathrata Grev.
Ulva latissima L.
Cladophora arcta Dillw.
Cladophora lanosa Roth.
Cladophora glaucescens Griff.
Cladophora flexuosa Griff.
Cladophora albida Huds.
Cladophora gracilis Griff.
Cladophora fracta Fl. Danica.
Chætomorpha melagonium Web. and Michr.
Chætomorpha ærea Dillw.
Chætomorpha Olneyi Harvey.
Hormotrichum Younganum Dillw.
Calothrix confervicola. —
Calothrix scopulorum. —

ON LOCAL VARIATIONS IN THE NOTES AND NESTING HABITS OF BIRDS.

BY ROBERT RIDGWAY.

MR. ALLEN has called attention to the variation in the notes of different birds at remote localities; and in this I am able to corroborate him, though I think that cases of such variation are very rare, and do not occur in more than perhaps five per cent. of the species. I have only detected it in two or three species after the most careful observation, and in very many cases noticed that there was not, in the minutest particular, any difference between individuals of one species on opposite sides of the continent. Such is undoubtedly the case in a very great majority of the species, any seeming variation that may be observed being more probably the peculiarity of an individual rather than the manifestation of any regional impress. The only instances wherein I have yet been able to satisfy myself of a difference in notes in two regions are the following; *Cardinalis Virginianus* has a far finer song in southern Illinois than it has in Maryland, the notes being not only clearer and more musical, but the song more continued and energetic; the effect being altogether richer. In the vicinity of Washington, D. C., I have never heard, in a single instance, the Baltimore oriole (*Icterus Baltimore*) utter such mellow, flute-like notes, as it habitually does in southern Illinois. The brown thrasher (*Harporhynchus rufus*) also sings more vigorously in the latter locality. In the far west I found the ground robins of the Wahsatch Mountains (*Pipilo* "*megalonyx*") to have such different notes from those of the eastern slope of the Sierra Nevada (in the neighborhood of Carson City) that it seemed that they must certainly be a different species; not only did the song differ, but all the notes were different. Yet upon the closest comparison of the specimens, no tangible differences in plumage or proportions could be detected in the majority of the specimens from the two localities, though occasional individuals from the latter place inclined, more or less, toward the form known as *P. Oregonus*.

The exact nature of the difference in notes between certain birds in the Potomac valley, and the valley of the lower Wabash, is a very marked *restraint* in the songs of the former, *as if they were afraid of being heard.* That they were more cautious in the neighborhood of noisy cities, than in the country surrounding quiet and less populous towns, might be readily suggested as the solution of this difference, were it not for the fact that other species, as, for instance, the robin (*Turdus migratorius*), the meadow lark (*Sturnella magna*), the catbird (*Galeoscoptes Carolinensis*), the *Thryothorus Ludovicianus* and numerous other species, sing as boldly and in a precisely similar way among the parks and shade trees in the midst of Washington City as they do in the quiet towns and retired orchards of southern Illinois. This objection may lose weight, however, when we consider that the species in which I have noticed a difference are birds of a suspicious and cautious nature, such as would be most readily influenced by the causes mentioned.

Mr. Allen has called attention* to variations in the mode of nesting, which he has noticed in many species of birds; and places undue importance upon it in considering certain deviations from the usual manner as characteristic of particular localities. My experience has been that such variations depend mainly upon the facilities afforded by the site of the location of the nest, and sometimes, no doubt, are the result of merely the caprice of the bird. The *Quiscalus purpureus* is cited as one example, and considerable stress is laid upon the fact of its placing the nest in cavities of trees in a certain locality in New England. At Mt.

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*See AMERICAN NATURALIST, vol. vi, p. 263.

Carmel, Illinois, where this species is very abundant, I have found its nests situated in a variety of ways upon one tree; some being saddled upon the branches, or supported in a crotch like those of the robin, and others placed in cavities, either natural ones such as knotholes or decayed places, or in the holes made by the larger woodpeckers (*Hylotomus* and *Colaptes*). I once found a very large colony of these birds breeding upon a small island in the Wabash River. The nests were all placed in the tall slender willows, none more than twenty feet from the ground, and many within easy reach without climbing; they were supported by small twigs *against the body of the saplings*, for there were no large limbs to support them. Probably more than a hundred pairs were nesting in this community, as upwards of seventy nests were found in a short time. Within the area of a square mile, I have found nests of the common dove (*Zenaidura Carolinensis*) upon trees, on the top of stumps in the thick woods, on the flat rail of a fence, and upon the ground in grain fields; also nests of *Harporhynchus rufus* in as diverse situations. Near Mt. Carmel the white-bellied swallow (*Tachycineta bicolor*) nests exclusively in holes made by the downy woodpecker (*Picus pubescens*) and chickadee (*Parus Carolinensis*), in the dead stumps around lagoons in the bottom lands, in company with the golden swamp warbler (*Protonotaria citrea*), with which it shares these cavities. At Carson City, Nevada, this species was noticed to nest only about houses, in the eaves or over porches, as the purple martin (*Progne subis*) does in the east. There were no trees there to accommodate them, which accounted for this deviation from their original habit. At Mt. Carmel, the purple martin and chimney swift (*Chætura pelagica*) have almost entirely forsaken these nesting places, and have taken up with man, the former being as domestic as house pigeons, and the latter possessing themselves of the chimneys. But the white-bellied swallow pertinaciously clings to its primitive custom. In California, according to various writers, and in Arizona according to Dr. Coues, the *T. thalassina* nests in holes in trees, but during two years of collecting in Nevada and Utah I never saw a nest of this species so situated; it constantly nested in horizontal fissures or crevices on the face of the limestone cliffs, in company with the "mud swallow" (*Petrochelidon lunifrons*) and white throated swift (*Panyptila melanoleuca*). This was apparently not owing to a lack of suitable places for nesting as it does in California and Arizona, for in the same localities were extensive aspen woods where *T. bicolor* and *P. subis* nested abundantly in holes made by the *Sphyrapicus nuchalis*. The inference drawn from this fact is, that it has a natural preference to rocks as a nesting place, always ignores the trees where suitable rocks are to be found; and that its nesting in trees in districts where precipices are rare or wanting is merely an evidence that it, like other species, adapts its habits to the character of the locality. The red-fronted linnet (*Carpodacus frontalis*) nests about houses in California; choosing nooks and crannies about the buildings, as well as the shade trees, for nesting places. At Sacramento I found a nest of this species built inside the pendulous, basket-like structure of the oriole (*Icterus Bullocki*). Along the Truckee River, in Nevada, another was found inside the mud nest of a cliff swallow (*P. lunifrons*); around Pyramid Lake the species nested among the rocks, frequently in caves with the *Sayornis Sayus* and *Hirundo horreorum*; while in the wooded portions of the Truckee valley its nests were common in the "grease wood" (*Obione*) bushes, along with those of *Spizella Breweri* and *Poöspiza bilineata*, as well as in the cottonwood trees near by. It would require too much space to describe all the different situations in which I have found the nests of *Troglodytes Parkmanni*, so that I will only mention some of the more remarkable instances of variation. In the Wahsatch Mountains, as well as in the Truckee valley, it was usual for the nests to be concealed behind the loose bark of a dead tree, the entrance being through a fissure in the bark at one side of the nest; probably eight out of every ten nests would be so situated. Many, however, were found inside of cavities, either natural or made by woodpeckers, while one was found built inside of a deserted robin's nest in the crotch of an aspen.

On the Truckee reservation one was found in the thatched roof of the storehouse. Everywhere, throughout the mountain of the great basin, the sparrow hawk (*Tinnunculus sparverius*) nests on the cliffs, in holes among the rocks, in company with the *Falco polyagrus*. At Mt. Carmel, I have found nests of *Colaptes auratus* in natural cavities in trees, and a nest of *Centurus Carolinus* in a low stump by the roadside, about three feet from the ground. At the same place, *Parus Carolinensis* bores its own nesting place in the soft wood of wild plum and sassafras trees, and frequently takes possession of natural hollows in stumps, uprooted "snags," or the deserted excavation of the downy woodpecker. I found a nest of the chimney swallow inside of a plank kiln for drying tobacco, and another inside of the hollow trunk of a sycamore tree. At Olney, I found a nest of the blue jay, containing five eggs, inside of an old deserted barn in the middle of the town, it being placed flat upon a sill. This is the only nest of the species I ever saw that was not placed in a tree. At Mt. Carmel, I have also found a nest of *Agelaius phœniceus*, containing eggs, in a small elm tree about twenty feet from the ground. In Kansas the *Euspiza Americana* is said to place its nest in trees ; but at Mt. Carmel it habitually places it on the ground in clover fields. The *Chondestes grammaca* almost invariably nests on the ground in the Wabash valley. I have never found a nest otherwise located ; but at Sacramento, where dozens of nests of this bird were found, all but one were in oak trees, at heights varying from ten to thirty feet from the ground. It is difficult to understand why the species should be so much more arboreal in the vicinity of Sacramento, which is far more scantily wooded than the localities frequented by this bird in Wabash valley. An instance of semi-parasitic habits is seen in the *Otus Wilsonianus*, which in Nevada habitually deposits its eggs in the old dilapidated nests of magpies.

During a series of several seasons' egg-collecting at Mt. Carmel, it was my constant experience to find several species of birds never laying more than three eggs at a complement ; and the recorded accounts of these species in various works saying that the same birds laid habitually four or five eggs puzzled me considerably. Three eggs in a nest is the maximum number that I have ever found in *Pyranga æstiva* and *Cardinalis Virginianus*.